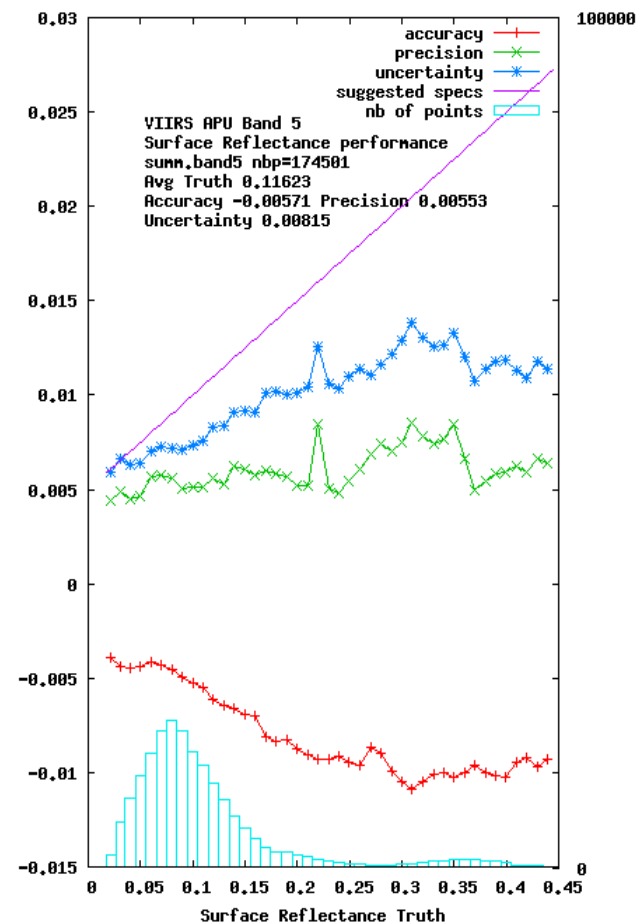
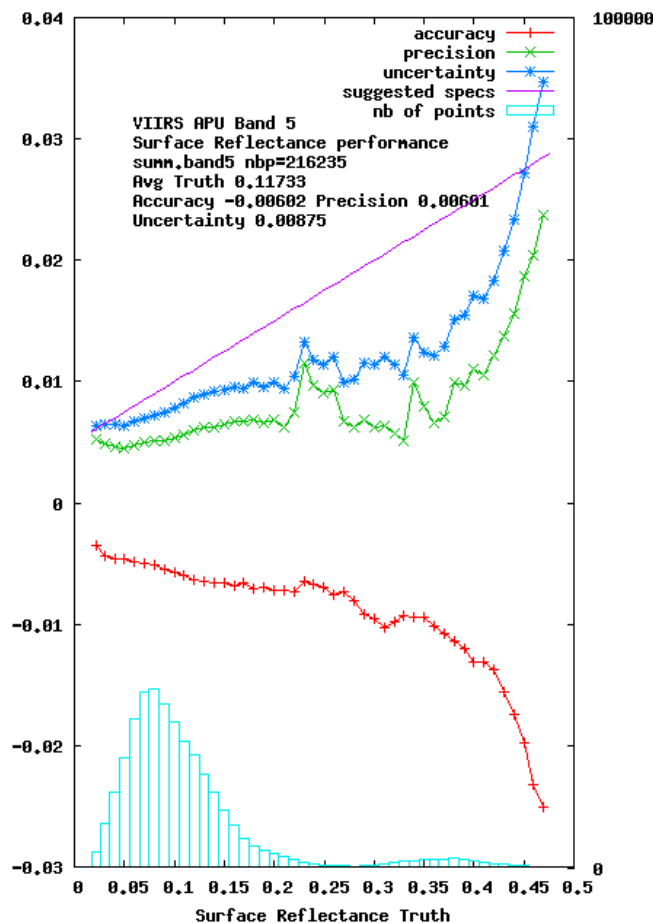


VIIRS Land Discipline Report-back

Chris Justice/Miguel Roman (VIIRS)

Instrument Discipline Leads

Testing of MODIS Collection 6 implementation for VIIRS Surface Reflectance (coming up in AS 5000)



Performance of the VIIRS Surface Reflectance in the red band derived over AERONET sites for 2012 (Left side) and 2013 (right side).

BRDF, ALBEDO, NBAR Continuity

MODIS

VIIRS

12 May 2014 (DOY 132)

WSAlbedo



NBAR

M5-Red(0-0.3)

M4-Green (0-0.3)

M3-Blue(0-0.3)

Quality

High Quality

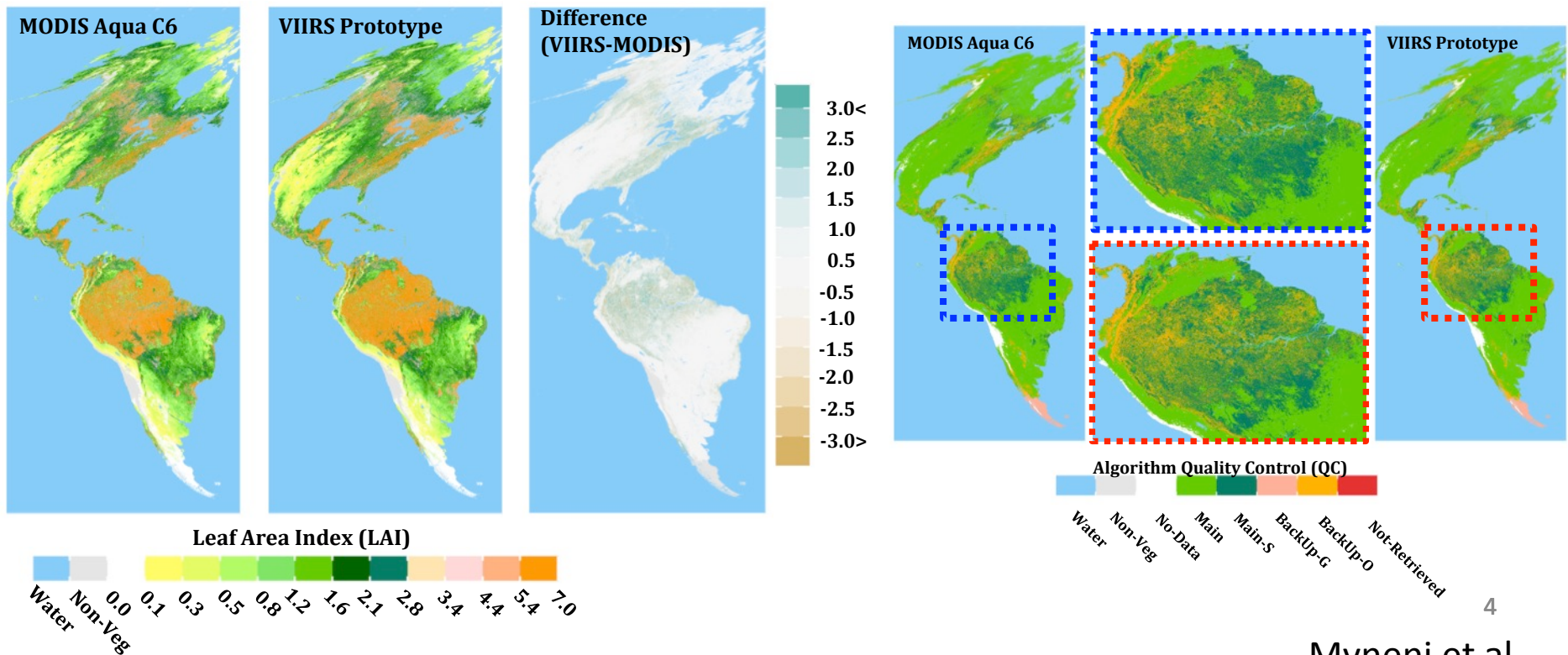
Poor Quality (Backup Alg)

No Data

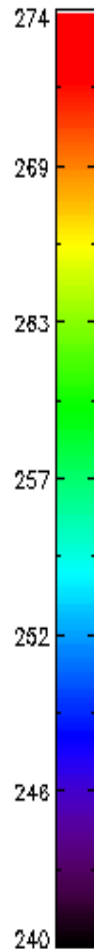
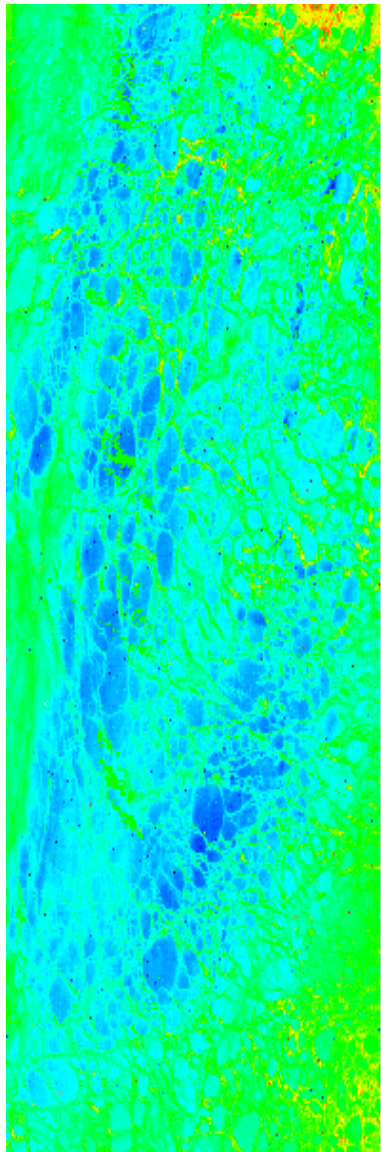
Schaaf et al



- ✓ Global scale LAI/FPAR comparison between optimized VIIRS & MODIS C6
 - Overall, comparable spatial distribution of LAI/FPAR & spatial coverage
 - Larger discrepancies are mostly induced by algorithm path mismatch (i.e., Main vs. Backup)
 - Relatively higher uncertainty in dense forest can be another causal factor (i.e., saturation)



NASA VIIRS Ice Surface Temp

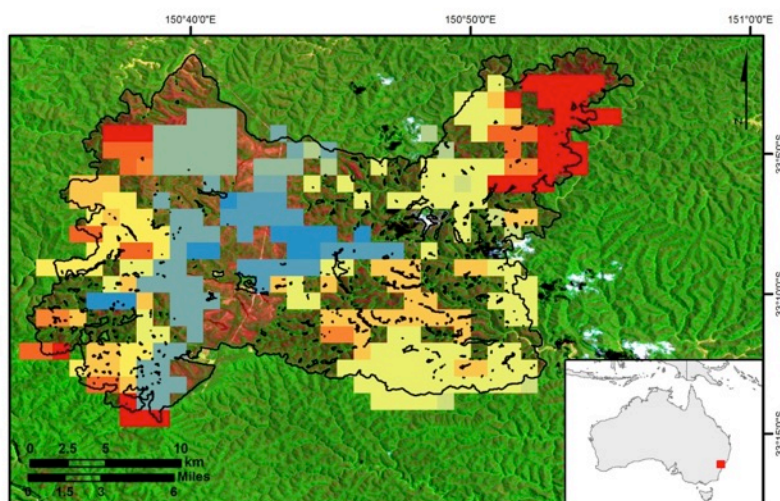


- Initial code generated from MODIS code by NASA's Land Science Investigator-led Processing System (LSIPS)
- Code being updated for VIIRS (calibration coefficients, etc.)
- New Quality Flags to be added
- Inter-comparison: MODIS, NCEP
- Validation: IceBridge, buoys
- First draft of ATBD delivered Jan. 2016

*Left: VIIRS IST (K) from the NASA VIIRS IST product
uses new calibration coefficients from J. Key
Sept 12, 2014, 21:10 UTC
Beaufort Sea, AK*

Improved Satellite Mapping of Active Fires Using VIIRS 375m Data

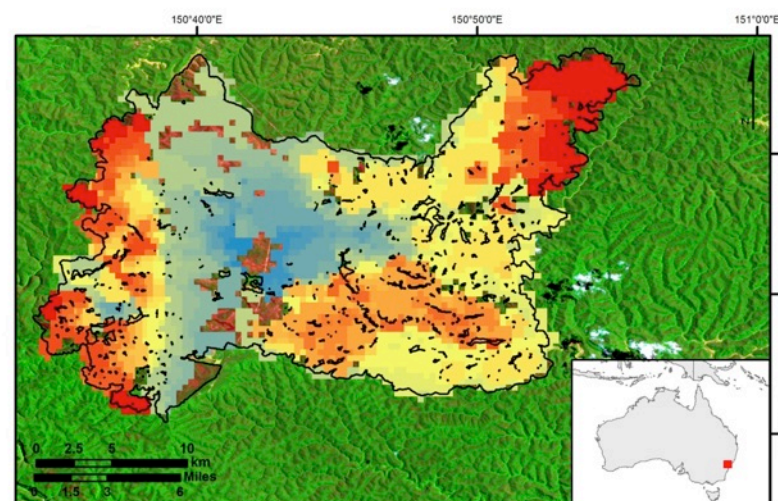
Aqua/MODIS 1km



MODIS-Aqua 1km

Date_Time (UTC)			
20131027 04:30	20131103 04:35	20131107 04:10	
20131024 04:00	20131028 03:35	20131104 03:40	20131108 04:55
20131025 04:40	20131028 04:05	20131105 04:25	20131109 04:00
20131026 03:55	20131102 03:55	20131106 03:30	

S-NPP/VIIRS 375m



VIIRS 375m

Date_Time (UTC)			
20131026 15:12	20131103 03:05	20131106 03:50	
20131023 14:27	20131027 03:37	20131106 15:07	
20131024 04:29	20131027 14:54	20131103 14:23	20131107 03:26
20131024 14:10	20131028 14:36	20131103 16:05	20131107 14:49
20131024 15:52	20131031 03:58	20131104 04:25	20131108 04:51
20131025 04:12	20131101 14:58	20131104 15:42	20131108 14:26
20131025 15:29	20131102 03:23	20131105 04:07	20131109 04:34
20131026 03:54	20131102 14:40	20131105 15:24	



V1 Forward Processing and Reprocessing: Schedule

Land Products: Schedule and Status



Product Name and ESDT series	Heritage MODIS	Product Status	Product Availability
Surface Reflectance VNP09		<p>Most products still in HDF 4</p> <p>Need to transition to HDF 5 - Conversion may cause c. 6 week delay in BRDF Suite and LAI /FPAR – land team working together through the conversion issues</p> <p>Land DAAC provided overguide to convert to HDF 5 compatible tools to minimize user impact</p>	Jun 2016
LAI/FPAR VNP15			June 16
Snow Products VNP10			June 16
MAIAC VNP19			July 2016
BRDF/Albedo VNP43			June 2016
Burned Area VNP64A1			March 2017
Active Fires VNP14			June 2016
Vegetation Index VNP13			August 2016
LST & E VNP11(VNP21)		Science code delivered and undergoing testing	Dec 2016
Ice Products VNP29/VNP30	MxD29	Science code under development at SCF	Nov 2016
Phenology VNP12Q2	MCD12Q2	Science code under development at SCF	Apr 2017
Day Night Band VNP39	None	Science code delivered and undergoing testing	Apr 2017

Example Operational Application – WFDSS

(<http://wfdss.usgs.gov>)

Time (CDT)	User	Note
08/28/2015 21:25	Barnes, Jennifer	14 day FSPro starting 8/28. Ignitions based on VIIRS heat from prior night. Winds and ERC based on Tea Pot. 3 day forecast used. Landscape edits calibrated to fast spread rate.



Pan Tool: Drag to pan. Shift-click, drag, and release to zoom. Double-click to re-center and zoom.

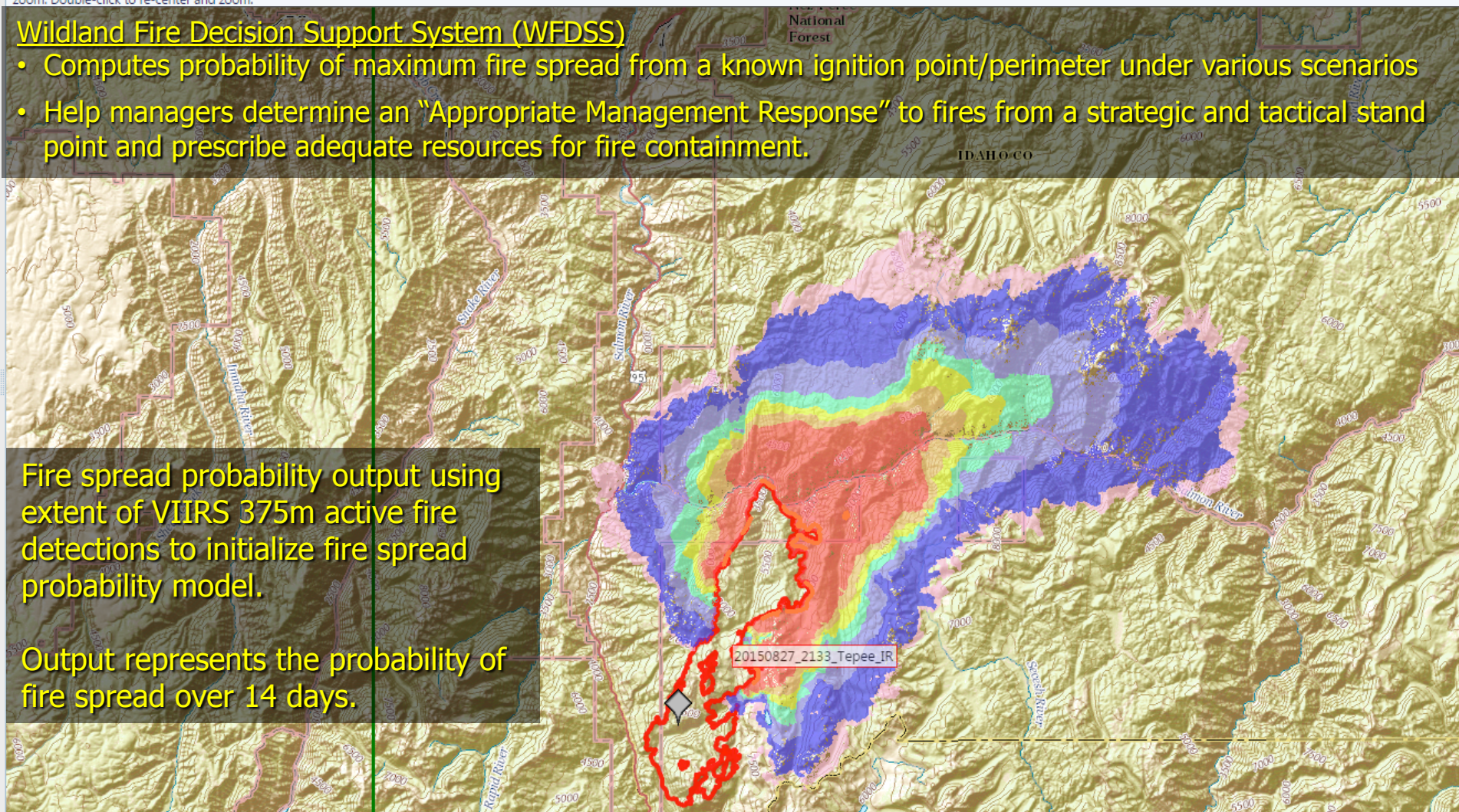


Wildland Fire Decision Support System (WFDSS)

- Computes probability of maximum fire spread from a known ignition point/perimeter under various scenarios
- Help managers determine an “Appropriate Management Response” to fires from a strategic and tactical stand point and prescribe adequate resources for fire containment.

Fire spread probability output using extent of VIIRS 375m active fire detections to initialize fire spread probability model.

Output represents the probability of fire spread over 14 days.



Land Product Validation

- General decrease in NASA Land Validation funding since EOS
- Land Strategy to leverage international efforts – coordination through CEOS LPV (Roman - chair)
 - Also important for equivalent international land products to be validated
 - Use the same protocols and reporting (RS community agenda)
 - CEOS LPV adoption of MODIS Validation Terminology
 - Developing Joint Agency approaches
- MODIS Validation has had significant funding over the years
 - All products at Stage 2 - Some products at or near Stage 3 (SR, Fire,)
 - *Web sites are being brought up to date*
- NOAA VIIRS Products undergo validation - linked to their operational status
- NASA VIIRS Validation (focus on major uncertainties)
 - Community expectation of Stage 2 Validation
 - Working with NOAA VIIRS Validation efforts as appropriate
 - Interacting with national/international networks (e.g. via LPV) – BSRN, NEON, NPN
 - GSFC sUAS

Considering Changing Projection ?

- Sinusoidal (equal area) adopted by MODLAND in the late 1990's
 - CMG format offers alternative at e.g. 30 Arc Sec grid
- Sinusoidal is problematic in terms of resampling particularly at high latitudes
 - Up sampling might present an option
- Evaluating changing to Geographic (or other) Projection from Sinusoidal
 - Pahlevan comparative analysis showed little radiometric impact
- Seeking User guidance from the Land DAAC UWG
- Suggestion to consider compatibility with the global Landsat projection solution (USGS/Landsat Science team) – Fall reprocessing schedule
- Discussion on-going

VIIRS Land Cover Issue

- NASA LC Product missing from the current VIIRS product suite
- Some higher level land products are dependent on land cover
- Current Approach:
 - Use MODIS Land Cover Product
 - Work with NOAA Annual Surface Type team to evaluate whether the product is sufficient

NOAA Operational VIIRS Land Product Status

- All remaining land / cryosphere products are being migrated to NOAA's Enterprise system using improved algorithms
 - Suomi NPP Data Exploitation (NDE)
 - Green Vegetation Fraction, Vegetation Health, Active Fire already in NDE
- Phased implementation following product dependencies
 - follows “Risk Reduction” package: clouds, aerosol, cryosphere etc.
 - Surface reflectance ~ February 2017; LST, Albedo, VI ~Aug 2017
- Annual Surface Type generated by STAR / UMD team
- Long-term quality monitoring ongoing
- IDPS production, long-term monitoring and maintenance continues until all downstream products are migrated into NDE/ NOAA ESPC Enterprise system
- Preparations for NPP reprocessing and J1 production ongoing
- CEOS protocols used for product validation
- NOAA JPSS Science Team meeting Aug 8 – 12th 2016 (College Park)
 - http://www.star.nesdis.noaa.gov/star/meeting_2016JPSSAnnual.php

Documentation and User Community Guidance

- *ATBD/Data Product Documentation and Reviews:*
 - *Documentation on web sites lacking for Sensor/Team/ATBDs/Data – new (and existing?) users (especially in the applied/operational world) need to find the details*

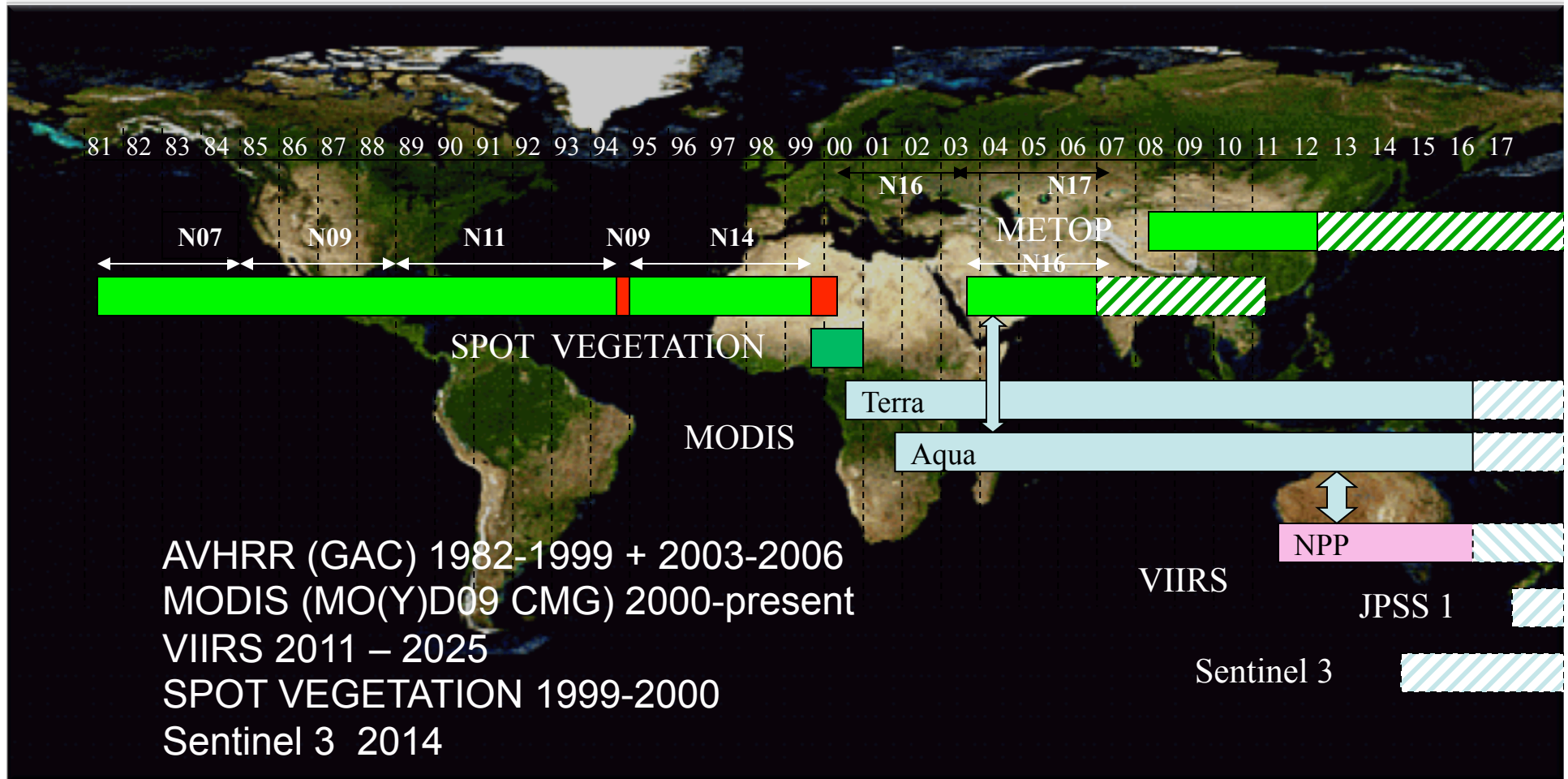
We could envision something like this on line:

 - *MODIS PRODUCT / CORRESPONDING VIIRS PRODUCT / COMMENTS / NASA funded & RELATED RESEARCH / REFERENCES”*
- Focus currently on getting the VIIRS Land Products ready for release
- Recognize that Attention is Needed to User-oriented Documentation re. Data Continuity (this coming year)
- Prior to re-competition documentation should be complete



A Land Climate Data Record

Multi instrument/Multi sensor Science Quality Data Records used to quantify trends and changes



We are trusting that JPSS-1 will be added to the NASA Climate Data Record – with funding for 1) Inst. Cal, 2) Data processing, 3) Product continuity 4) Science

MODIS/VIIRS Science Team Meeting, June 6-June 10, Silver Spring, MD

The strength of the MODIS AM/PM Combination

- MODIS Terra is degrading
- In the next two years we we will potentially have 3 satellites with similar overpass times (Aqua, SNPP, JPSS1)
- SNPP and JPSS1 is planned 'operational' redundancy
- 3 satellites would be excessive redundancy
- For the land community, AM and PM provides several improved science algorithms (cloud cover)
- Explore moving Aqua to AM overpass
 - As Aqua degrades SNPP will become the cal. gold standard
 - Question of fuel use (lifetime reduction) to change orbit
 - Are there any other discipline objections ?

This Meeting Format

- Benefit for all to hear the calibration presentations and the HQ perspectives
- Some good multi-instrument science presentations
- Not much inter-disciplinary communication or cross fertilization
 - Algorithm maintenance product status not so interesting across disciplines
- For VIIRS Land we could have benefited from a two-day 'working meeting' developing the production
- Suggestion – one large meeting after selection – then devolve to discipline/instrument meetings – perhaps one overall science meeting at the end of the funding cycle to show results
- 5 days !